Claims:

1. A cell containing

(a) a first DNA construct or pair of first DNA constructs encoding chimeric proteins comprising (i) at least one receptor domain capable of binding to a selected ligand and (ii) another protein domain, heterologous with respect to the receptor domain, and

(b) a target gene encoding an angiogenesis inhibitor under the expression control of a transcriptional control element responsive to binding of ligand to the ligand binding domain.

2. The cell of claim 1 wherein the chimeric proteins multimerize upon addition of ligand and wherein transcription of the target gene is responsive to the multimerization of the chimeric proteins.

3. The cell of claim 1 wherein the ligand binding domain is selected from the group consisting of an immunophilin domain, a cyclophilin domain, a steroid hormone binding domain and an antibiotic binding domain.

4. The cell of claim 1 wherein the angiogenesis inhibitor is selected from the group consisting of thrombospondin, angiostatin, endostatin, angiostatin-endostatin fusion proteins, angiopoietin-2, a soluble receptor for VEGF, a dominant negative form of VEGF, anti-VEGF antibodies, soluble Tie2/Tek receptor and the 16 kD fragment of prolactin.

5. The engineered cell of claim 1 or 4 in which the target gene encodes a peptide sequence of human origin.

6. A cell containing

(a) a first DNA construct or pair of first DNA constructs encoding chimeric proteins comprising (i) at least one receptor domain capable of binding to a selected ligand and (ii) another protein domain, heterologous with respect to the receptor domain, and

(b) a target gene encoding a tumor specific antigen under the expression control of a transcriptional control element responsive to binding of ligand to the ligand binding domain.

7. The cell of claim 6 wherein the chimeric proteins multimerize upon addition of ligand and wherein transcription of the target gene is responsive to the multimerization of the chimeric proteins.

8. The cell of claim 6 wherein the ligand binding domain is selected from the group consisting of an immunophilin domain, a cyclophilin domain, a steroid hormone binding domain and an antibiotic binding domain.

9. A cell containing

(a) a DNA construct encoding a chimeric protein consisting essentially of (i) a receptor domain capable of binding to a selected ligand, (ii) a transcription activation domain, heterologous with respect to the receptor domain, (iii) and a DNA binding domain; and

(b) a target gene encoding beta-interferon or a cytokine under the expression control of a transcriptional control element responsive to binding of ligand to the ligand binding domain.

10. The cell of claim 9 wherein the ligand binding domain is selected from the group consisting of a steroid hormone binding domain and an antibiotic binding domain.

11. The cell of claim 6 or 9 in which the target gene encodes a peptide sequence of human origin.

12. A recombinant virus containing

(a) a first DNA construct or pair of first DNA constructs encoding chimeric proteins comprising (i) at least one receptor domain capable of binding to a selected ligand and (ii) another protein domain, heterologous with respect to the receptor domain, and

(b) a target gene encoding an angiogenesis inhibitor, a tumor specific antigen, a cytokine or beta-interferon under the expression control of a transcriptional control element responsive to binding of ligand to the ligand binding domain.

13. The recombinant virus of claim 12 wherein the virus is selected from the group consisting of adenovirus, adeno-associated virus, retrovirus and herpesvirus.

14. A method for rendering cells capable of regulatable expression of a target gene following exposure of the cells to a selected ligand, which method comprises introducing into the cells:

(a) a first DNA construct or pair of first DNA constructs encoding chimeric proteins comprising (i) at least one receptor domain capable of binding to a selected ligand and (ii) another protein domain, heterologous with respect to the receptor domain, and

(b) a target gene under the expression control of a transcriptional control element responsive to binding of ligand to the ligand binding domain,

wherein the target gene encodes an angiogenesis inhibitor or a tumor specific antigen.

15. The method of claim 14 wherein the angiogenesis inhibitor is selected from the group consisting of thrombospondin, angiostatin, endostatin, angiostatin-endostatin fusion proteins, angiopoietin-2, a soluble receptor for VEGF, a dominant negative form of VEGF, anti-VEGF antibodies, soluble Tie2/Tek receptor and the 16 kD fragment of prolactin.

16. A method for rendering cells capable of regulatable expression of a target gene following exposure of the cells to a selected ligand, which method comprises introducing into the cells:

(a) a DNA construct encoding a chimeric protein consisting essentially of (i) a receptor domain capable of binding to a selected ligand, (ii) a transcription activation domain, heterologous with respect to the receptor domain, (iii) and a DNA binding domain; and

(b) a target gene encoding beta-interferon or a cytokine under the expression control of a transcriptional control element responsive to binding of ligand to the ligand binding domain.

17. The method of claim 14 or 16 wherein the DNA constructs are introduced into cells maintained in vitro.

18. The method of claim 14 or 16 wherein the DNA constructs are introduced into cells present within a host organism.

19. The method of claim 14 wherein the chimeric proteins multimerize upon addition of ligand and wherein transcription of the target gene is responsive to the multimerization of the chimeric proteins.

20. The method of claim 14 or 16 wherein the ligand binding domain is selected from the group consisting of an immunophilin domain, a cyclophilin domain, a steroid hormone binding domain and an antibiotic binding domain.

SUB B8

21. A method for treating cancer in a mammalian host organism containing cells which:

contain (a) a first DNA construct or pair of first DNA constructs encoding chimeric proteins comprising (i) at least one receptor domain capable of binding to a selected ligand and (ii) another protein domain, heterologous with respect to the receptor domain, and
(b) a target gene under the expression control of a transcriptional control element responsive to binding of ligand to the ligand binding domain; and

which express the target gene, following exposure to the selected ligand;

wherein the target gene encodes an angiogenesis inhibitor, a tumor-specific antigen or a cytokine;

which method comprises administering to said mammalian host an effective amount of a selected ligand capable of binding to the chimeric protein to effect observable expression of the target gene.

22. A method for treating MS episodes in a mammalian host organism containing cells which:

contain (a) a first DNA construct or pair of first DNA constructs encoding chimeric proteins comprising (i) at least one receptor domain capable of binding to a selected ligand and (ii) another protein domain, heterologous with respect to the receptor domain, and
(b) a target gene encoding beta-interferon under the expression control of a transcriptional control element responsive to binding of ligand to the ligand binding domain; and

which express the target gene, following exposure to the selected ligand;

which method comprises administering to said mammalian host an effective amount of a selected ligand capable of binding to the chimeric protein to effect observable expression of the target beta-interferon gene.

23. A method for treating HIV infection in a mammalian host organism containing cells which:

contain (a) a first DNA construct or pair of first DNA constructs encoding chimeric proteins comprising (i) at least one receptor domain capable of binding to a selected ligand and (ii) another protein domain, heterologous with respect to the receptor domain, and
(b) a target gene under the expression control of a transcriptional control element responsive to binding of ligand to the ligand binding domain; and

which express the target gene, following exposure to the selected ligand;

wherein the target gene encodes a ribozyme or antisense message directed against an HIV nucleotide sequence;

which method comprises administering to said mammalian host an effective amount of a selected ligand capable of binding to the chimeric protein to effect observable expression of the target gene.

add as